

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO:

FILING DATE:

APPLICANT: Carmen Burns

TITLE: Method of Manufacturing a Surface Mount Package **[as amended]**

PRELIMINARY AMENDMENT

Box New App Fee
Assistant Commissioner for Patents
Washington, D.C. 20231

Prior to examining this application, please enter the following amendments and consider the following remarks.

In the Title:

Please change the title to "Method of Manufacturing a Surface Mount Package."

In the Specification:

Cross-Reference to Related Applications

Please amend the specification as follows:

At page 1, after the heading "Specification" and before the heading "Background of the Invention," please delete lines 7 through 11 and insert the following:

Certificate of Express Mail

I hereby certify that this paper or fee is being deposited with the United States Postal Service via "Express Mail Post Office to Addressee" Mailing Label No. EK379035894US, under CFR 1.10, , on the 16 day of January, 2001, and is addressed to the Box New App Fee, Assistant Commissioner for Patents, Washington, D.C. 20231.

M. R. M.

Kyle A. Moon

-- This application is a divisional of application Serial No. 09/222,263, filed 12/28/98, pending, which is a continuation-in-part of application Serial No. 08/774,699, filed 12/26/96, abandoned, which is a continuation of 08/497,565, filed 06/30/95, now issued as U.S. Pat. No. 5,631,193, which is a continuation of application Serial No. 07/990,334, filed 12/11/92, now issued as U.S. Patent No. 5,484,959. --

Please make the following changes:

At page 2, line 20, after "lead" insert "is."

At page 6, line 11, delete "the numeric reference" and insert "the referenced element."

At page 7, line 3, after "surface," please delete "53" and insert "56" in its place.

At page 7, line 4, after "surface," please delete "53" and insert "56" in its place.

At page 7, line 19, after "elements," please delete "62" and insert "65" in its place.

At page 7, line 25, please delete "mill" and insert "mils" in its place.

At page 8, line 1, after "provide," please delete "a."

At page 8, line 3, after "traces," please delete "65."

At page 8, line 18, after "form," please insert "a."

At page 8, line 18, after "flange," please delete "55" and insert "57" in its place.

At page 8, line 21, after "package," please delete "ball" and insert "lead" in its place.

At page 9, line 9, please delete "electrical-insulating" and insert "electrically-insulating"

in its place.

At page 9, line 22, after "carrier," please delete "65" and insert "60" in its place.

At page 9, line 23, after "carrier," please delete "65" and insert "60" in its place.

At page 9, line 23, after "has," please delete "an."

At page 9, line 23, please delete "portion" and insert "portions" in its place.

At page 9, line 23, please delete “extends” and insert “extend” in its place.

At page 9, line 26, after “surface,” please delete “41” and insert “56” in its place.

At page 10, line 11, after “mounted to package,” please delete “50d” and insert “50e” in its place.

At page 10, line 19, after “package” and before “surface,” please delete “lead.”

At page 10, line 24, please delete “conductivity” and insert “conductive” in its place.

At page 11, line 2, please insert “of” between “manufacture” and “a.”

At page 11, line 3, after “surface,” please delete “56” and insert “54” in its place.

At page 11, line 16, please insert “the” between “cause” and “solder.”

At page 11, line 16, after “solder,” please delete “53.”

At page 11, line 16, after “adhesive,” please delete “66” and insert “70” in its place.

At page 12, line 9, after “carrier,” please delete “61” and insert “60” in its place.

At page 12, line 12, after “portion,” please delete “65.”

In the Claims

Please cancel claim29.

Please amend the following claims:

30. (Amended) The integrated circuit module of claim [29, wherein each said lead connection portion is formed having] 43, in which package lead reception areas include an aperture adapted to receive one of said package leads.

31. (Amended) The integrated circuit module of claim 30, [wherein each said] in which the aperture [is formed to have] has a semi-circular shape.

32. (Amended) The integrated circuit module of claim 30, [wherein each said] in which the aperture is formed to include peripheral channels adapted to [fill] be filled with excess molten solder.

33. (Amended) The integrated circuit module of claim [29] 43, further comprising:
a second integrated circuit package having a top surface and a bottom surface in which plural package leads extend from the bottom surface; and
a first adhesive layer and second adhesive layer, wherein said first adhesive layer is located between [said lead carrier and one of said adjacent packages, and the said] the top surface of the first lead frame and the bottom surface of the first integrated circuit package and the second adhesive layer is located between [said lead carrier and the other of said adjacent packages] the bottom surface of the first lead frame and the top surface of the second integrated circuit package to form a module.

34. (Amended) The integrated circuit module of claim 33, [wherein said] in which the adhesive layer is thermally conductive.

35. (Amended) The integrated circuit module of claim [29] 43, further comprising:
(a) a [substrate-mounting] substrate mounting portion [formed] for mounting a stacked multiple package module on the substrate with the substrate mounting portion, the substrate mounting portion being integral to the distal end of at least one [said] of the interconnect [portion] extensions. [; and]

a substrate attached to said substrate-mounting portions.]

36. (Amended) The integrated circuit module of claim [29] 43, further [comprised of]

comprising:

[one or more] a plurality of electrically and thermally conductive external structures [each] having a substrate mounting portion; and
[wherein select ones] in which a selected one of [said] the external structures [are] is electrically and thermally coupled to [select ones of said] a selected one of the interconnect [portions] extensions.

37. (Amended) The integrated circuit module of claim [29] 43, [wherein] further comprising:

[a first of said lead carriers of said multiple package module is dissimilar to a second of said lead carriers of said multiple package module, wherein on of said] a second lead frame being different in shape from that of the first lead frame and having a plurality of electrically and thermally conductive elements each having a package lead reception area and an interconnect extension in which selected interconnect [leads] extensions of said first lead [carrier] frame and the corresponding interconnect [portions] extensions of said second lead [carrier] frame do not electrically connect to the corresponding [said] package leads.

38. (Amended) The integrated circuit module of claim [30, wherein a select one] 43, in which a selected one of said interconnect [portions] extensions of the associated conductive elements is rendered electrically inactive by opening [the] an electrical signal path in the [select] selected one of said conductive elements.

39. (Amended) The integrated circuit module of claim 30, [wherein a select one] in which the interconnect extension of a selected one of said [interconnect portions] conductive elements is removed.

40. (Amended) The integrated circuit module of claim [38, wherein said lead carriers]
37, in which the lead frames provide a unique address for [each said package] the selected
packages.

41. (Amended) The integrated circuit module of claim [38, wherein said lead carriers]
37, in which the lead frames provide a unique data word bit position for [each said package] the
selected packages.

Please add the following claims:

42. The method of claim 1 further comprising the step of mounting the second lead carrier to the bottom surface of the second package.

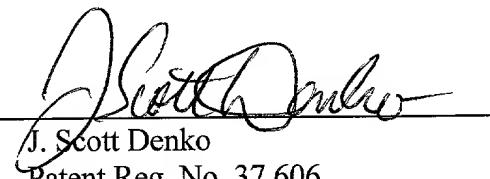
43. An integrated circuit module comprising:
a first integrated circuit package having a top surface and a bottom surface in which plural package leads extend from the bottom surface;
a first lead frame having a plurality of electrically and thermally conductive elements each having a package lead reception area and an interconnect extension, the first lead frame mounted to the bottom surface of the first integrated circuit package to align selected package lead reception areas of the conductive elements with selected package leads in a one-to-one correspondence to provide electrically and thermally conductive extensions of the selected package leads through the interconnect extensions of the selected conductive elements;
an external interconnect structure mounted to the top surface of the first integrated circuit package and having electrically and thermally conductive extensions that make

electrical and thermal contact with the interconnect extensions of the selected conductive elements and having interconnection portions that complete a communication path from the package leads through the electrically and thermally conductive elements and the electrically and thermally conductive extensions to allow electrical and thermal conduction to a circuit board substrate while providing mechanical rigidity to the thereby created module.

In the Drawings

Please indicate entry of the corrections to the drawings that are indicated in red ink in Exhibit A, which exhibit is attached to this Amendment.

Respectfully submitted,
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1/16/01
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